

REMARKS

The specification has been amended at page 7, paragraph 32, in compliance with the Examiner's observations and instructions.

With regard to pagination, applicant has reproduced his retained copy of the specification. In this retained copy, all pages were numbered, and said copy is submitted herewith. However, applicant was unable to modify the retained copy of this electronic version to correct the printing errors in paragraph 32. Applicant was able to make this correction in a computer-generated ABX copy of the specification. This copy, modified by the required corrections, and including page numbers, is also submitted herewith.

The specification has been amended at page 7, paragraph 36, to correct a printing error ("sown") in line 2 of that paragraph.

The specification has been amended at page 8, paragraph 39, by replacing "third plate 14a" by -- tube 14a --, to correct an incorrect reference to the element 14a in line 4 of that paragraph.

Claims 1 - 4 have been amended, to overcome rejections under 35 U.S.C. 112, 102, and 103, and to define more clearly and definitely the claimed invention.

Claims 5 - 7 have been cancelled, to place the application in condition for allowance.

Claims 8 - 16 have been added.

Antecedent basis for amending claims 1 - 4, and for adding claims 8 - 18, is provided by the specification at pages 6 - 10, and by **FIGS. 1** and **2**.

A corrected set of drawings is submitted under 37 CFR 1.85(a) and 1.121(d), in compliance with the Examiner's objection to the drawings filed 06 August 2003.

A terminal disclaimer of U.S. Patent No. 6,604,562 to Smith is submitted herewith, together with a check in the amount of \$65.00 in payment of the fee therefor .

APPLICANT'S ARGUMENTS FOR PATENTABILITY

Claim 1 (currently amended)

The Rejection Under 35 U.S.C. 112

As currently amended, claim 1 recites means for supporting the detachable head, for urging the detachable head against the tree and attaching the detachable head to the tree, and for separating the detachable head from the rest of the tree pusher as the tree falls, so that the detachable head remains attached to the tree as the tree falls.

An element in a claim for a combination may be expressed as a means for performing a specified function without the recital of structure in support thereof, and such claim shall be construed to cover the corresponding structure described in the specification and equivalents thereof. 35 U.S.C. 112.

In the specification, the means for supporting the detachable head are described as a base comprising a tube having first and second ends, and a plate fastened to the first end of the tube. (Page 8, lines 6 – 9, as amended).

The means for urging the detachable head against the tree are described as a screw-type propeller trailer jack, pivotally mounted on the base, for urging the tree pusher against the tree. (Page 5, lines 6 – 8.)

The means for attaching the head to the tree are described as a plurality of prongs. (Pages 7 – 8, paragraph 38.)

The means for separating the detachable head from the rest of the tree pusher are described as the **circular** tube or bar **12a** and the **circular** tube **14a**, so that the tube or bar **12a** can freely rotate in the tube **14a** as the tree falls. (Pages 8 – 9, paragraph 0042.)

Reconsideration and withdrawal of the rejection are respectfully requested.

The Rejection Under 35 U.S.C. 102 over U.S. Patent No. 4,564,173 to Atherton et al.

It is respectfully submitted that Atherton et al. do **not** disclose a detachable head constructed and arranged for separation from the rest of the tree pusher and remaining attached to the tree as the tree falls, nor means for doing so, as recited in claim 1 as amended. The head (tip member 30[20]) is **affixed** onto the top end 74 of a shaft 28 by a set screw 76[16]. The bottom end 64 of the elongated shaft 28 is **affixed** into an aperture 54 in a support member 24 by a set screw 68. (FIG. 2; col. 2, lines 4 – 47.) It will be apparent to those skilled in the art that, in order for the head / tip member 30[20] to be separated from the rest of the tree pusher, and to remain attached to the tree as the tree falls, it would be necessary for an operator to loosen and remove the set screws 76[16] and 68 **before** the head is attached to the tree. To do so, however, would be to render the tree pusher inoperable, because these set screws are necessarily in place to keep the head 30 and the shaft 28 attached to the rest of the tree pusher. Moreover, not only is such manual loosening of the set screws neither disclosed nor suggested by the patent, but the reference actually teaches away from such a hypothetical scenario by implying that the head 30 pulls loose from the tree and remains with the rest of the tree pusher as the tree falls. (Claim 1.) A patent cited as a reference must be taken as a whole for what it fairly teaches. In re Wesslau, 147 USPQ 791.

A second basis for distinguishing over Atherton et al. is that the jack which they disclose is a **bumper jack**, not a **screw-type propeller trailer jack**, **pivotally** mounted on the base. (Specification, page 5, lines 6 – 8.) As previously noted above in reference to the rejection under 35 U.S.C. 112, the **screw-type propeller jack**, **pivotally** mounted on the base, comprises the means for urging the tree pusher against the tree and attaching the detachable head to the tree. It is to be further noted that there is no disclosure nor suggestion that the bumper jack disclosed by Atherton et al. is **pivotally** mounted on a base. Pivotal mounting of the screw-type propeller trailer jack provides a range of motion conducive to detaching the head from the rest of the tree pusher so that the head remains with the tree as the tree falls, and for ready conversion from a position for moving the tree pusher into a stored or retracted position. (Specification, page 7, lines 2

– 7.) Furthermore: (a) A bumper jack is not capable of handling the weight of a large tree. (b) A bumper jack cannot extend its length to a jack post if a longer jack is needed to push the tree over. (c) The bumper-jack post would bear the entire weight of the tree. If the post should break, the tree could very possibly fall on the person or persons felling the tree, or fall in some other undesirable direction. (Specification, page 3, lines 1 – 8.)

A third basis for patentability over the patent to Atherton et al. is the structure of the means for attaching the detachable head to the tree being felled. As stated in the specification at pages 7 – 8, paragraphs 37 - 38: The detachable head **12** (FIGS. 2 and 3) comprises a tube or bar **12a** having first and second ends **12b** and **12c**. The first end **12b** of the tube or bar **12a** is fastened to a first plate **12d**. A plurality of prongs **12e** are fastened to the first plate **12d**. Preferably, a second plate **12f** is fastened transversely to the prongs **12e**, to brace the prongs **12e**. **The tube or bar 12a and each prong 12e define therebetween an angle 12g of from about five to about thirty degrees.** The attachment means disclosed by Atherton et al. comprise points 70 which are **parallel to** the shaft 28 on which the tip member 30[20] is mounted.

A fourth basis for patentability over the reference to Atherton et al. is that, as previously noted, the means for separating the detachable head from the rest of the tree pusher comprise the **circular** tube or bar **12a** and the **circular** tube **14a**, so that the tube or bar **12a** can freely rotate in the tube **14a** as the tree falls. (Pages 8 – 9, paragraph 0042.) It was argued above that Atherton et al. disclose a head that does **not** separate from the rest of the tree pusher, and remain attached to the tree as the tree falls. These arguments are sound, and are firmly based on the specification/disclosure and claims of Atherton et al. By contrast, the detachable head described and claimed in the present application is constructed and arranged to do just that, and the means for doing so are clearly set forth in the specification at pages 8 – 9, paragraph 42, as noted.

The structures of both the detachable head and of the base for the head are crucial in implementing attachment to the tree and separation of the head from the rest of the tree pusher as the head remains with the falling tree.

It is critically important that the head **12** remains attached to the tree trunk as the tree falls. For this reason it is critical that the tube or bar **12a**, the tube **14a**, and the opening **14e** be circular/cylindrical, not square or rectangular. A cylindrical tube or bar

can freely rotate in the tube **14a** and in the opening **14e** of the tube **14a** as the tree falls; a rectangular tube would bind. Detachability of the head **12** is an extremely important aspect of the present invention, and an extremely important advantage of the invention over the prior art.

The construction of the detachable head **12** of the tree pusher **2** is critical. In order to attach itself to the tree, the head **12** must embed itself and remain embedded in the wood of the tree. Otherwise, the bark of pine and hardwood trees will break, and the head **12** will come loose and slide off the trunk of the tree. With the head **12** constructed as shown in **FIGS. 2** and **3**, having prongs **12e** which define an angle **12g** of from about five to about thirty degrees with the tube or bar **12a**, the head **12** will remain in contact with the tree as the tree is pushed over its center of gravity to the point where the tree will fall. The center of gravity of a tree that is leaning e.g. ten degrees, with limbs on the side toward which the tree is leaning, is not in line with the trunk, but is somewhere out on the limbs. A tree with this type of lean has to be pushed far over center before the tree will fall. The angle **12g** of the prongs **12e** keeps the head **12** in contact with the trunk until and as the tree falls.

For trees that are twisted or crooked, the head **12** must embed and remain embedded in the wood, because the tree will twist or move while being felled. The prongs **12e** of the head **12** must remain embedded in the wood, and the head **12** must be able to turn in the tube **14a** so as not to lose contact with the tree, or to move the tree pusher **2** during the felling operation. The head **12** cannot be fastened or remain attached to the rest of the tree pusher **2**, because if the tree twisted or turned, the head **12** would twist or turn the tree pusher **2**, causing loss of control of the tree-pushing operation. As constructed, the pronged head **12** will turn or twist with the movement of the tree, and will not move or twist the tree pusher **2**. The head **12** will detach from the remainder of the tree pusher **2** and stay with the falling tree, leaving the rest of the tree pusher **2** safe and unmoved. The head **12** is then removed and recovered from the trunk of the fallen tree, and reused in future operations.

Prior-art tree pushers do not have this important feature. Consequently, either the head will pull out of the tree and remain with the frame of the tree pusher as the tree falls, or the entire tree pusher will be pulled over along with the falling tree. In the former

case, control of the operation will be lost; in the latter, a very dangerous situation will be created—a situation which could cause serious injury to personnel and/or major damage to the tree pusher. (Specification, pages 8 – 11, paragraphs 42 – 45.)

Reconsideration and withdrawal of the rejection are respectfully requested.

Claim 2 (currently amended)

The Rejection Under 35 U.S.C. 112

As currently amended, claim 2 recites means for supporting the detachable head, for urging the detachable head against the tree, for attaching the detachable head to the tree, and for separating the detachable head from the rest of the tree pusher as the tree falls, so that the detachable head remains attached to the tree as the tree falls.

The arguments advanced above for claim 1 as amended apply equally to claim 2 as amended.

Reconsideration and withdrawal of the rejection are respectfully requested.

The Rejection Under 35 U.S.C. 103 Over U.S. Patent No. 2,969,309 to Swanson
in View of U.S. Patent No. 4,564,173 to Atherton et al.

The arguments advanced above for claim 1 as amended apply equally to claim 2 as amended, with respect to the Atherton et al. reference.

With regard to the Swanson reference, it is submitted, first, that, as amended, this claim recites (f) a base for the detachable head, the base for the head including a third tube, the detachable head including a tube or bar, the base for the head being fastened to the second end of the second tube, and providing means for movable disposition of the tube or bar in the third tube. It is respectfully submitted that Swanson fails to disclose, suggest, or in any way make obvious an additional third tube, a tube or bar, and means for movable disposition of the tube or bar in the third tube.

It is submitted, second, that the jack disclosed by Swanson is by no means comparable to the screw-type propeller trailer jack (6) disclosed and claimed by applicant

as means for urging the detachable head against the tree and attaching the head to the tree. Furthermore, the jack disclosed by Swanson is **not pivotally** mounted, as required by the means clause in paragraph (g) of applicant's amended claim. The advantages of the screw-type propeller trailer jack over other types of jacks have been previously recounted, as have the advantages of pivotally mounting the jack.

A third basis for patentability over the patent to Swanson is the structure of the means for attaching the detachable head to the tree being felled. As stated in the specification at pages 7 – 8, paragraph 37: A plurality of prongs **12e** are fastened to the first plate **12d**. Preferably, a second plate **12f** is fastened transversely to the prongs **12e**, to brace the prongs **12e**. **The tube or bar 12a and each prong 12e define therebetween an angle 12g of from about five to about thirty degrees.** The attachment means disclosed by Swanson comprise prongs **35 parallel** to the elongated pressure member **27**. (Col. 2, lines 13 – 16; Figures 1 and 2.)

Finally, it is submitted that, not only, as observed by the Examiner, does Swanson not disclose a detachable head, but this patent actually teaches away from applicant's claim recitation of leaving the detachable head attached to the tree as the tree falls. Specifically, at col. 2, lines 21 – 24, the reference reads: "Prongs 35 extend upwardly from plate 25 and the plate permits a firm grip without excessive penetration while also **causing the plate to fall away from the tree as the tree falls.**"

Reconsideration and withdrawal of the rejection are respectfully requested.

Claim 3 (currently amended)

This claim has not been rejected by the Examiner under 35 U.S.C. 102 or 103 over prior art.

As amended, claim 3 recites (h) a plate fastened perpendicularly to one end of the tube or bar of claim 2, and (i) a plurality of prongs fastened obliquely to the plate, the prongs being constructed and arranged to embed themselves in the wood of a tree being felled.

The concluding arguments advanced above regarding the structure of the detachable head for the patentability of claim 1 as amended over the prior art are equally

cogent here. These arguments are taken directly from the specification, paragraphs 43 and 44. Fastening the plate **perpendicularly** to the tube or bar, and fastening the prongs **obliquely** to the plate ensure that the prongs define an acute angle with the tube or bar.

Claim 4 (currently amended)

This claim has not been rejected under 35 U.S.C. 102 or 103 over prior art.

As amended, claim 4 specifies that each prong and the tube or bar define therebetween an angle of from about five to about thirty degrees.

The arguments advanced above in support of claim 3 as amended apply with equal cogency to claim 4 as amended.

Claims 1 – 4 (currently amended)

The Double-Patenting Rejection

In compliance with the rejection of these claims under the judicially-created doctrine of obviousness-type double patenting over U.S. Patent No. 6,604,562 [6,604,561] to Smith, applicant submits herewith an appropriate terminal disclaimer.

Summary of Arguments for Patentability

It is submitted that, in view of the amendments, arguments, and terminal disclaimer, claims 1 – 4 are now allowable. Reconsideration, withdrawal of the rejections, and allowance of claims 1 – 4 are respectfully requested.

Claim 8 (new)

The arguments advanced in support of claim 3 (amended) apply with equal cogency to claim 8.

Allowance of claim 8 is respectfully requested.

Claim 9 (new)

The arguments advanced in support of claim 4 (amended) apply with equal relevance to claim 9.

Allowance of claim 9 is respectfully requested.

Claim 10 (new)

This claim recites a **cylindrical** tube for movable disposition therein of the **cylindrical** rigid elongated member of the detachable head.

It is critically important that the head **12** remains attached to the tree trunk as the tree falls. For this reason it is crucial that the tube or bar **12a**, the tube **14a**, and the opening **14e** be circular/cylindrical, not square or rectangular. A cylindrical tube or bar can freely rotate in the tube **14a** and in the opening **14e** of the tube **14a** as the tree falls; a rectangular tube would bind. Detachability of the head **12** is an extremely important advantage of the invention over the prior art. (Specification, paragraph 42.)

Allowance of claim 10 is respectfully requested.

Claim 11 (new)

This claim is a combination of claim 1 (amended) and claim 8. Accordingly, the arguments advanced in support of claims 1 and 8 apply with equal force to the combination claim 11.

Allowance of claim 11 is respectfully requested.

Claim 12 (new)

This claim recites a cylindrical tube, for movable disposition therein of the cylindrical rigid elongated member of the detachable head.

This claim is identical with claim 10, except that claim 10 depends from claim 8, and claim 12 depends from claim 11. Accordingly, the reasons advanced in support of claim 10 are as cogent for claim 12.

Allowance of claim 12 is respectfully requested.

Claim 13 (new)

This claim specifies that the means for urging the detachable head against the tree include a screw-type propeller trailer jack, pivotally mounted on the base.

A screw-type propeller trailer jack is capable of (a) handling the weight of a large tree, and (b) extending its length to a jack post if a longer jack is needed to push the tree over. Pivotal mounting of the jack provides a range of motion conducive to detaching the head from the rest of the tree as the tree falls, and for ready conversion from a position for moving the tree pusher into a stored or retracted position. (Specification, page 7, lines 2 – 7.)

Allowance of claim 13 is respectfully requested.

Claim 14 (new)

Claim 14 recites the means for separating the detachable head from the rest of the tree pusher.

It is critically important that the head remains attached to the tree trunk as the tree falls. (Specification, paragraph 42, line 1.) To do so requires that the head detach itself from the rest of the tree pusher. The means here recited are neither anticipated nor made obvious by the prior art.

Allowance of claim 14 is respectfully requested.

Claim 16 (new)

Claim 16 is exactly the same as claim 9, except that claim 9 refers to claim 8, and claim 16 to claim 14. Accordingly, the reasoning applied to allowability of claim 9 is equally applicable to claim 16.

Allowance of claim 16 is respectfully requested.

SUMMARY, CONCLUSIONS, AND PETITION

In conclusion, it is submitted that, in view of the amendments, arguments, corrected formal drawings, and terminal disclaimer herein presented, the application is in condition for allowance. Reconsideration, withdrawal of the objections and rejections, and allowance of the application are respectfully requested.

Respectfully submitted

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Electronic Version

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Description

TREE PUSHER

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation-in-part of prior Application No. 10/064,161, filed June 17, 2002.

BACKGROUND OF INVENTION

[0002] The present invention relates to felling trees. More particularly, the present invention relates to felling trees in a safe and efficient manner by controlling the direction in which the tree falls.

[0003] When felling trees, it is a constant problem to determine the direction in which the tree will fall. The problem is especially severe when the tree is leaning in an undesirable direction; e.g., in the direction of a nearby house. When the tree is not leaning in any direction, there is still the problem of preventing the tree from falling on the person or persons who is/are felling the tree. The present invention provides a device and a method for causing the tree to fall in a desired direction.

[0004] Attempts have been made to solve these problems, but they have not been successful.

[0005] U.S. Patent (U.S.P.) No. 4,184,462 to Jessup discloses a tree-felling device adapted to engage a tree being cut down, and to exert a force thereagainst in a particular direction, in order to cause the tree to fall in a selected area. The tree-felling device includes a jacking device of the basic bumper type which is adapted to support an elongated pusher having a tree-engaging head secured at one end thereof, and which is preferably tied to the tree to be cut. As a part of the jacking device, there is provided a ratchet mechanism having an anchoring stud secured thereto for generally receiving and stabilizing one end of said pusher, while the jacking assembly is provided with a support clip about the top portion thereof for holding the pusher.

[0006] U.S.P. 4,564,173 to Atherton et al. discloses an apparatus for pushing a tree over when the tree is being cut down. When a base connected to a bumper jack is placed on a ground surface, the apparatus is tipped at an angle between the ground surface and the tree. A jack handle operates a mechanism to rise along a jack post, causing a support member to push a shaft through an aperture in a guide member until points on a tip member contact the tree, pushing the tree over when the tree is being cut down.

[0007] The principal defects of these prior-art inventions are the following:

- [0008] (a) A bumper jack is not capable of handling the weight of a large tree.
- [0009] (b) A bumper jack cannot extend its length to a jack post if a longer jack is needed to push the tree over.
- [0010] (c) The bumper-jack post would bear the entire weight of the tree. If the post should break, the tree could very possibly fall on the person or persons felling the tree, or fall in some other undesirable direction.
- [0011] (d) In the case of the Jessup patent, the head plate (36) which engages the tree is not embedded in the wood of the tree. If the tree turns or twists, the head plate will move, slip, or become disconnected from the tree.
- [0012] (e) In the case of the Jessup patent, there is nothing to hold the head plate (36) up while the tree-felling device is placed in position to fell the tree.
- [0013] (f) In the case of the Jessup patent, once the tree is lying on the ground, it would be difficult to disconnect and remove the chain (38) from the tree trunk.
- [0014] (g) In the case of the Jessup patent, there is nothing to prevent the pusher (34) from sliding off the head plate (36) when pressure is applied by the jack.
- [0015] (h) In the case of the Jessup patent, in the event that the tree

twists or turns, there is nothing to hold the pusher (34) against the head plate (36).

[0016] (i) The bumper jack lifts the load with a ratcheting action that allows for a rocking motion of the tree. This can cause the wood in the hinge point to break.

[0017] (j) Bumper jacks have a large number of moving parts, and have springs which may weaken and break.

[0018] (k) Under load, the support plate for the jack would flip or rise up in front, causing the plate to skid or to be pushed backwards.

[0019] (l) There is nothing to prevent the jack support plate from being pushed into the ground or away from the tree.

[0020] (m) Neither tree-felling device is usable on hard surfaces.

[0021] (n) There is no effective way of transporting the tree-felling devices to the job site.

[0022] The present invention provides an effective solution to these and other problems described along with a detailed description of the invention.

SUMMARY OF INVENTION

[0023] In general, the present invention in a first aspect provides a tree pusher for safely felling a tree. The tree pusher comprises (a) a base; (b) a detachable head; and (c) means, mounted on

the base, for supporting the detachable head and for urging the detachable head against the tree. The detachable head is constructed and arranged for attachment to the tree while the tree is being felled, and for separation from the rest of the tree pusher and remaining attached to the tree as the tree falls. More specifically, the tree pusher comprises (a) a base; (b) a screw-type propeller trailer jack, pivotally mounted on the base, for urging the tree pusher against the tree; (c) a first tube having first and second ends, the first end of the first tube being connected to the jack; (d) a second tube having first and second ends, the second tube having a smaller cross-sectional area than the first tube, the first end of the second tube being disposed in and fastened to the second end of the first tube; (e) a detachable head, constructed and arranged for engaging the tree, for disposition in the second end of the second tube while the tree is being felled, and for disengagement from the second end of the second tube as the tree falls, the detachable head remaining attached to the tree as the tree falls; and (f) a base for the detachable head, the base for the head being fastened to the second end of the second tube, and providing means for movable disposition of the detachable head in the second tube.

[0024]

In a second aspect the invention provides a detachable head for engaging a tree that is being felled. The detachable head

comprises (a) a rigid elongated member, (b) a plate fastened to one end of the elongated member, and (c) a plurality of prongs fastened to the plate.

BRIEF DESCRIPTION OF DRAWINGS

[0025] *FIG. 1* is an isometric view of a tree pusher, made in accordance with the principles of the present invention.

[0026] *FIG. 2* is a side view of a detachable head for a tree pusher, made in accordance with the principles of the present invention.

[0027] *FIG. 3* is a front view of the detachable head shown in *FIG. 2*.

[0028] *FIG. 4* is a side view of a base for the detachable head shown in *FIGS. 2* and *3*.

[0029] *FIG. 5* is a front view of the base for the detachable head shown in *FIG. 4*.

DETAILED DESCRIPTION

[0030] More specifically, reference is made to *FIG. 1*, in which is shown a tree pusher made in accordance with the principles of the present invention, and generally designated by the numeral 2.

[0031] The tree pusher 2 comprises a base 4, a screw-type propeller jack 6, a first tube 8, a second tube 10, a detachable head 12, and a base 14 for the detachable head 12.

[0032] The base 4 includes a hook 4a to engage a chain (not shown) used to secure the tree pusher to a tree being felled. The leg 6a of the jack 6 is pivotally connected to the base 4 by a pin 16, and by a pair of plates 18 which strengthen the area around the pin 16. A wheel 20 is pivotally mounted on the jack leg 6a, and can be readily converted from a position for moving the tree pusher 2 into a stored or retracted position.

[0033] The first tube 8 is connected to the jack 6 by two flat pieces 21, and is bolted to the jack 6 by a pair of plates 22 which include openings 22a for bolts (not shown). The plates 22 are welded to the jack 6 and to the flat pieces 21.

[0034] The second tube 10 has one end 10a disposed in one end 8a of the first tube 8. The ends 8a and 10a of the first and second tubes 8 and 10 are pinned to one another by a pin 24.

[0035] Disposed in the other end 10b of the second tube 10 are the detachable head 12 and the base 14 for the attachable head 12.

[0036] The structures of the head 12 and base 14 are more clearly shown in FIGS. 2-5, to which reference is now made.

[0037] The detachable head 12 (FIGS. 2 and 3) comprises a tube or bar 12a having first and second ends 12b and 12c. The first end 12b of the tube or bar 12a is fastened to a first plate 12d.

[0038] A plurality of prongs *12e* are fastened to the first plate *12d*. Preferably, a second plate *12f* is fastened transversely to the prongs *12e*, to brace the prongs *12e*. The tube or bar *12a* and each prong *12e* define therebetween an angle *12g* of from about five to about thirty degrees.

[0039] The base *14* (*FIGS. 4 and 5*) for the detachable head *12* comprises a tube *14a* having first and second ends *14b* and *14c*, and a third plate *14d* fastened to the first end *14b* of the third plate *14a*. As seen in *FIG. 5*, the third plate *14d* includes an opening *14e*.

[0040] The detachable head *12* is constructed and arranged so that the bar or tube *12a* is disposable in the tube *14a* of the base *14* when the bar or tube *12a* is inserted through the opening *14e* of the third plate *14d*. The tube *14a* serves as a sleeve, and the third plate *14d* as a collar for the bar or tube *12a*.

[0041] Reference is again made to *FIG. 1*, in which is shown the head *12* and base *14* for the head *12* disposed in the second tube *10* of the tree pusher *2*. The first and second tubes *8* and *10* may be made of square/rectangular or circular/cylindrical tubing; the tube or bar *12a* and the tube *14a* must be circular/cylindrical, to prevent binding. Likewise, the opening *14e* must be circular, in conformity with the tube or bar *12a*.

[0042]
It is critically important that the head *12* remains attached to

the tree trunk as the tree falls. For this reason it is critical that the tube or bar 12a, the tube 14a, and the opening 14e be circular/cylindrical, not square or rectangular. A cylindrical tube or bar can freely rotate in the tube 14a and in the opening 14e of the tube 14a as the tree falls; a rectangular tube would bind. Detachability of the head 12 is an extremely important aspect of the present invention, and an extremely important advantage of the invention over the prior art.

[0043]

The construction of the detachable head 12 of the tree pusher 2 is critical. In order to attach itself to the tree, the head 12 must embed itself and remain embedded in the wood of the tree. Otherwise, the bark of pine and hardwood trees will break, and the head 12 will come loose and slide off the trunk of the tree. With the head 12 constructed as shown in *FIGS. 2* and *3*, having prongs 12e which define an angle 12g of from about five to about thirty degrees with the tube or bar 12a, the head 12 will remain in contact with the tree as the tree is pushed over its center of gravity to the point where the tree will fall. The center of gravity of a tree that is leaning e.g. ten degrees, with limbs on the side toward which the tree is leaning, is not in line with the trunk, but is somewhere out on the limbs. A tree with this type of lean has to be pushed far over center before the tree will fall. The angle 12g of the prongs 12e keeps the head 12 in contact with the trunk until

and as the tree falls.

[0044] For trees that are twisted or crooked, the head 12 must embed and remain embedded in the wood, because the tree will twist or move while being felled. The prongs 12e of the head 12 must remain embedded in the wood, and the head 12 must be able to turn in the tube 14a so as not to lose contact with the tree, or to move the tree pusher 2 during the felling operation. The head 12 cannot be fastened or remain attached to the rest of the tree pusher 2, because if the tree twisted or turned, the head 12 would twist or turn the tree pusher 2, causing loss of control of the tree-pushing operation. As constructed, the pronged head 12 will turn or twist with the movement of the tree, and will not move or twist the tree pusher 2. The head 12 will detach from the remainder of the tree pusher 2 and stay with the falling tree, leaving the rest of the tree pusher 2 safe and unmoved. The head 12 is then removed and recovered from the trunk of the fallen tree, and reused in future operations.

[0045] Prior-art tree pushers do not have this important feature. Consequently, either the head will pull out of the tree and remain with the frame of the tree pusher as the tree falls, or the entire tree pusher will be pulled over along with the falling tree. In the former case, control of the operation will be lost; in the latter, a very dangerous situation will be created--a

situation which could cause serious injury to personnel and/or major damage to the tree pusher.

[0046] While certain embodiments and details have been described to illustrate the present invention, it will be apparent to those skilled in the art that many modifications can be made without departing from the spirit, scope, and basic concept of the invention.

Claims

- [c1] I claim:
1. A tree pusher, comprising:
 - a. a base;
 - b. a detachable head; and
 - c. means, mounted on the base, for supporting the detachable head and for urging the detachable head against the tree;the detachable head being constructed and arranged for attachment to the tree while the tree is being felled, and for separation from the rest of the tree pusher and remaining attached to the tree as the tree falls.
- [c2] 2. A tree pusher, comprising:
- a. a base;
 - b. a screw-type propeller jack, pivotally mounted on the base, for urging the tree pusher against the tree;
 - c. a first tube having first and second ends, the first end of the first tube being connected to the jack;
 - d. a second tube having first and second ends, the second tube having a smaller cross-sectional-area than the first tube, the first end of the second tube being disposed in and fastened to the second end of the first tube;
 - e. a detachable head, constructed and arranged for

engaging the tree, for disposition in the second end of the second tube while the tree is being felled, and for disengagement from the second end of the second tube as the tree falls, the detachable head remaining attached to the tree as the tree falls; and

f. a base for the detachable head, the base for the head being fastened to the second end of the second tube, and providing means for movable disposition of the detachable head in the second tube.

[c3] 3. The tree pusher of claim 2, wherein the detachable head comprises:

g. a cylindrical rigid elongated member;

h. a plate fastened to one end of the elongated member; and

i. a plurality of prongs fastened to the plate, the prongs being constructed and arranged to embed themselves in the wood of a tree being felled.

[c4] 4. The tree pusher of claim 3, wherein each prong and the rigid elongated member define therebetween an angle of from about five to about thirty degrees.

[c5] 5. The tree pusher of claim 3, wherein the base for the detachable head comprises:

j. a cylindrical tube, for movable disposition therein of the cylindrical rigid elongated member of the detachable head;

and

k. a plate, fastened to one end of the tube, and including a circular opening for insertion therethrough of the cylindrical rigid elongated member of the detachable head.

[c6] 6. A detachable head for a tree pusher, the detachable head comprising:

a. a cylindrical rigid elongated member;

b. a plate fastened to one end of the elongated member;

and

c. a plurality of prongs fastened to the plate, the prongs being constructed and arranged to embed themselves in the wood of a tree being felled.

[c7] 7. The detachable head of claim 6, wherein each prong and the rigid elongated member define therebetween an angle of from about five to about thirty degrees.

TREE PUSHER

Abstract

A tree pusher for safely felling a tree. The tree pusher includes (a) a base, (b) a frame, and (c) a detachable pronged head for gripping the tree while the tree is being felled. As the tree falls, the head remains attached to the tree, and detaches itself from the frame of the tree pusher.

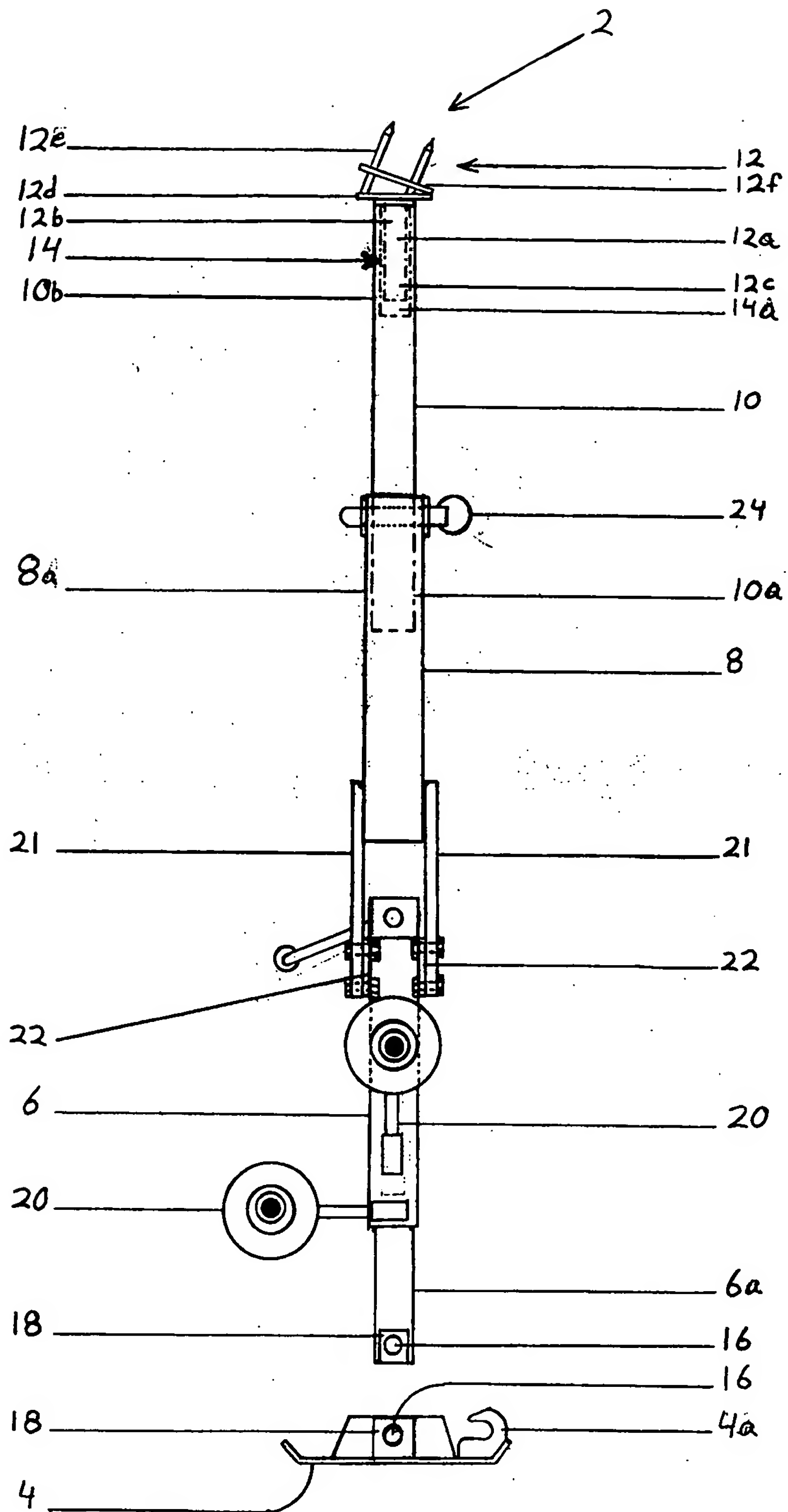
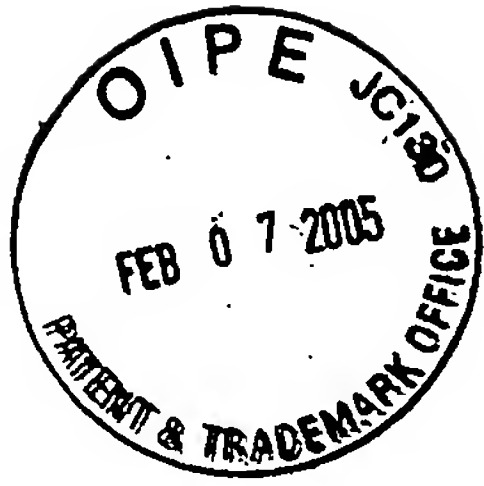


FIG. 1

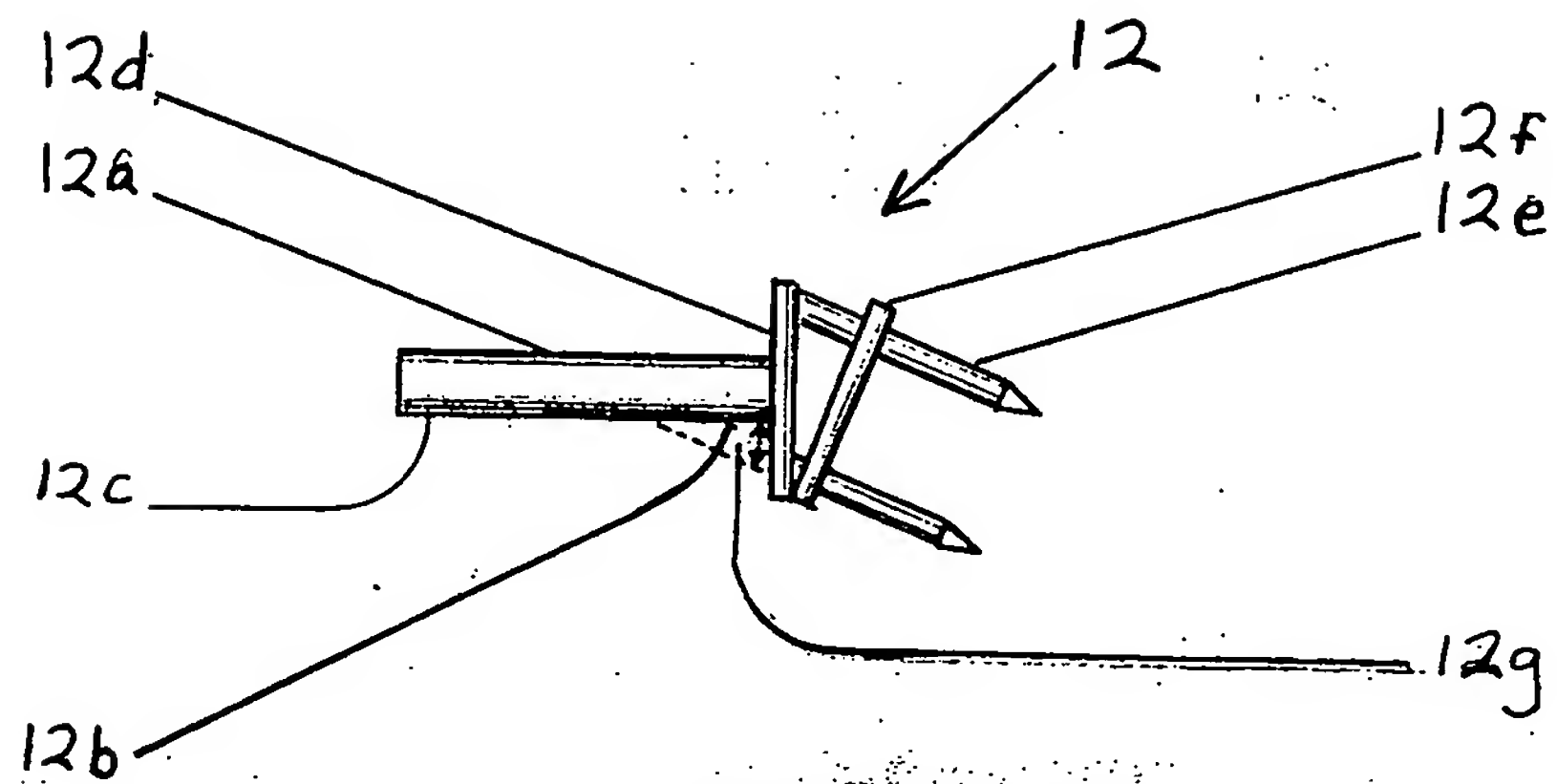


FIG. 2 (2)

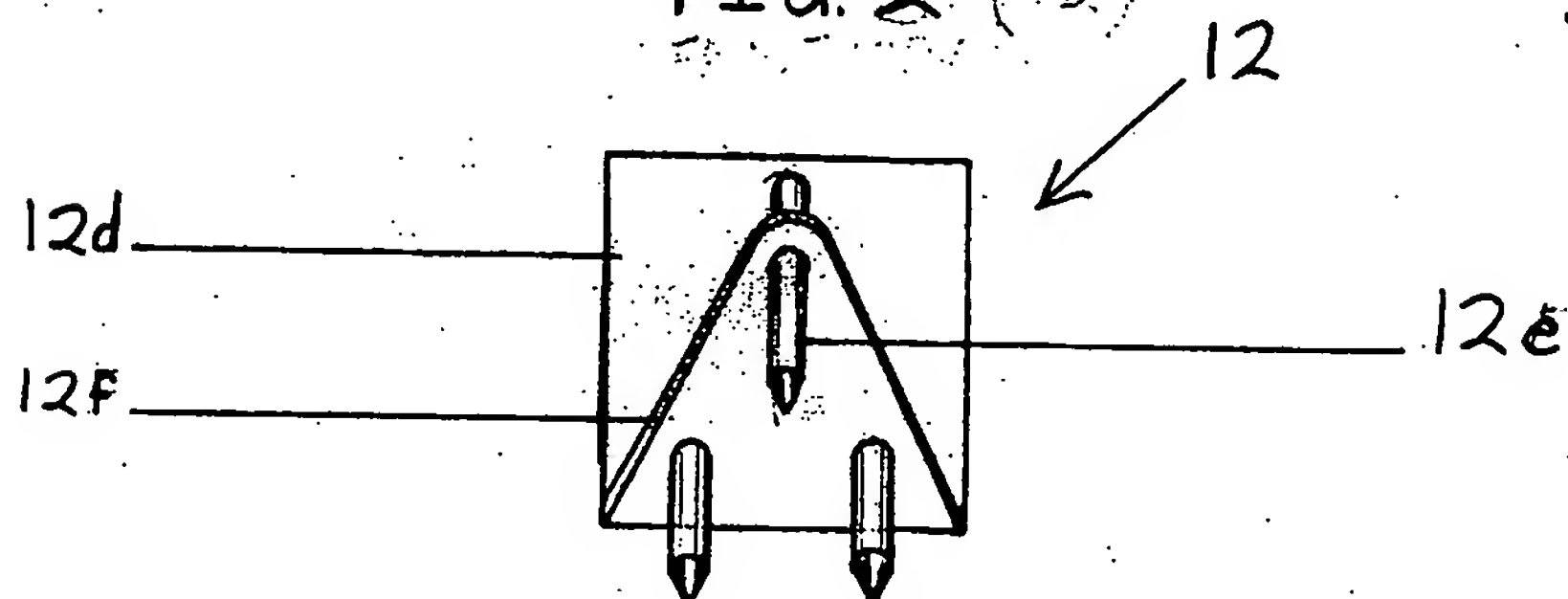


FIG. 3 (4)

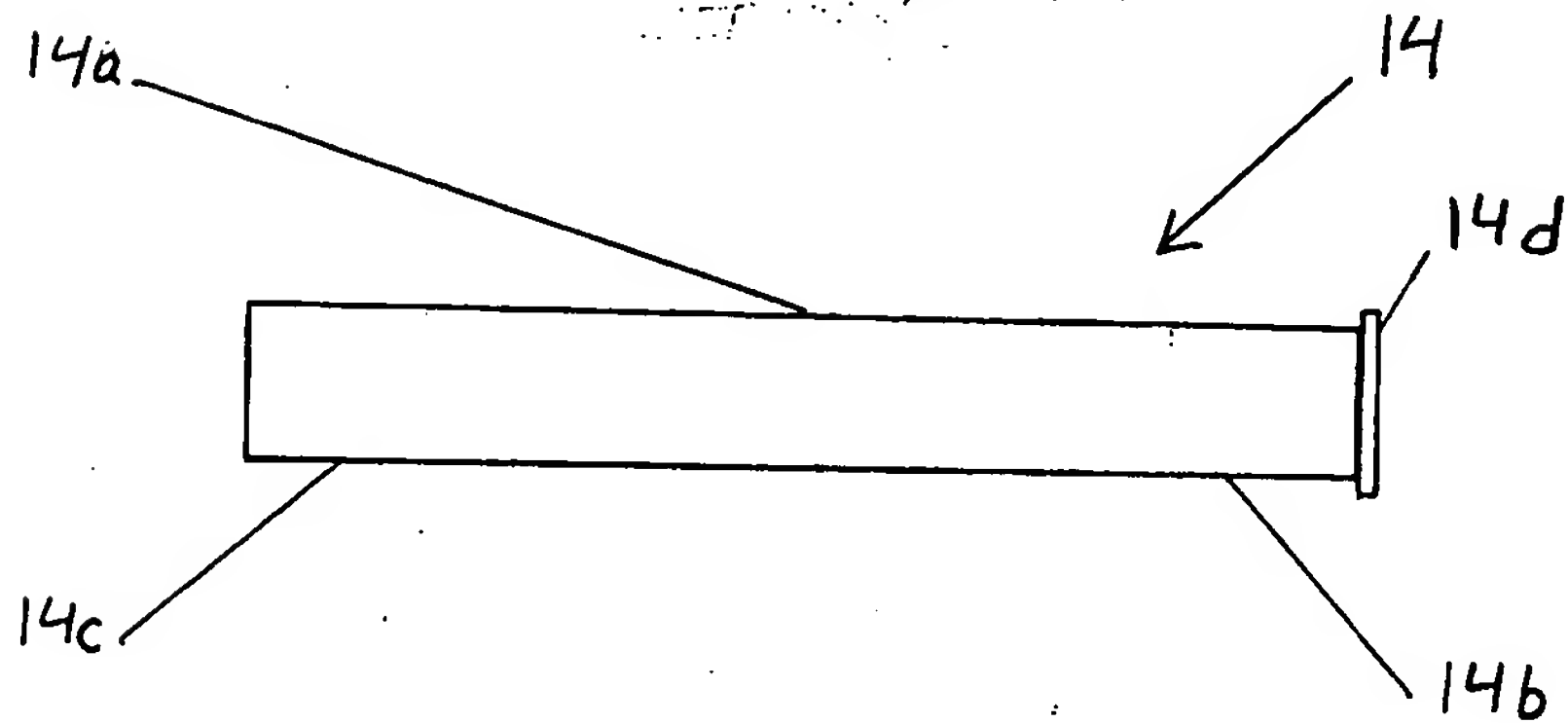


FIG. 4

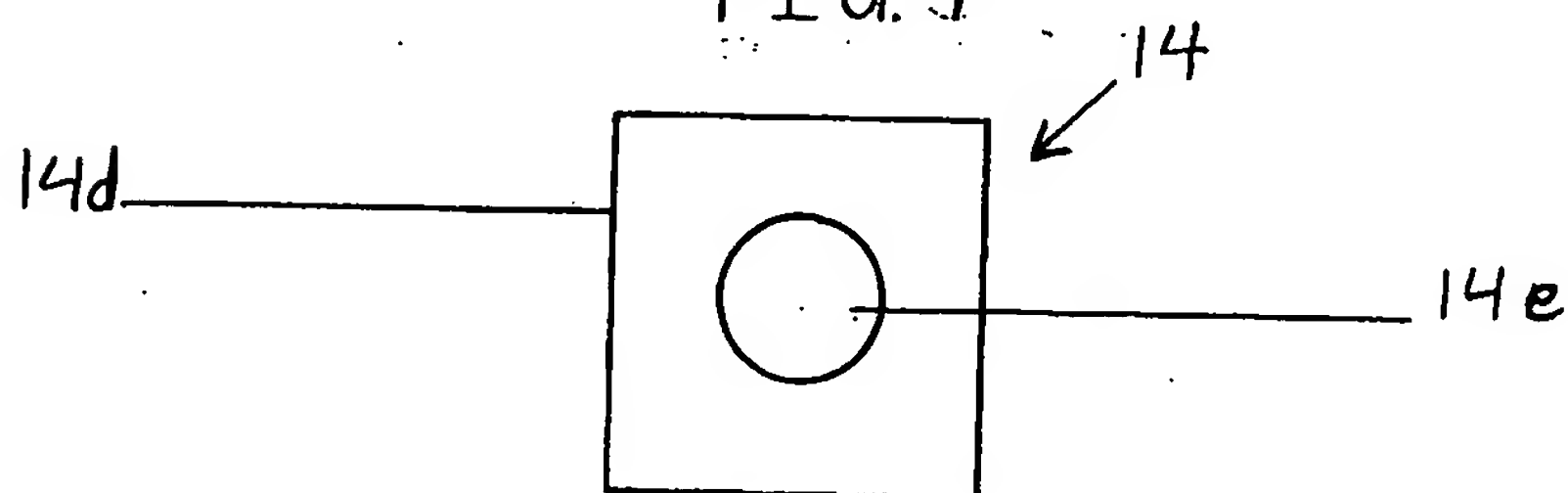


FIG. 5